

Appendix D

Dichotomous Key to Plant Communities of Effigy Mounds National Monument

Introduction to the Key

This is a key to National Vegetation Classification System (NVCS) plant communities (associations) of Effigy Mounds National Monument (EFMO) along with their corresponding map classes. The plant communities are based on 63 plot samples collected at EFMO during 2001–02. We developed this key post field effort, and consequently leave it untested in the field. We did, however, develop the key from the analyses of the vegetation plot and accuracy assessment sampling data. Guidelines and conventions to the key are as follows:

- Leads of the key end at the name for the NVCS plant communities found during the project. The plant community name is also the map class name, unless otherwise stated.
- Some leads include map class phases following the plant community name. A map class phase is a version of a plant community that is recognizable on the aerial photographs and is important to distinguish as a map unit for either management or ecological interests.
- In some cases, a lead ends at a “park special” map class and not at a specific plant community. These map classes are highly disturbed or manipulated vegetation and thus are not classified at the association level of the NVCS. They are, however, classified to the NVCS at the formation level.
- Relative Dominance (RD) is the proportion of the total canopy occupied by a species (e.g., if *Quercus alba* cover value is 30% in a setting in which the canopy cover totals 60%, then *Q. alba*’s RD is 50%).
- In the context of forest communities, dominance means >60% total canopy cover unless otherwise noted. Of wetland macrophyte communities, it means >75% cover.

Which Key to Use

Trees or shrubs usually forming $\geq 25\%$ total canopy cover.....**FOREST AND SHRUBLAND KEY**
Trees or shrubs usually forming <25 total canopy cover**HERBACEOUS VEGETATION KEY**

FOREST AND SHRUBLAND KEY

- 1a.** Forests or shrublands of bottomlands, river terraces, or lowlands fringing ponds: soils seasonally or temporarily flooded, or saturated throughout the season **2**
- 1b.** Forests or shrublands of uplands: soils neither seasonally or temporarily flooded nor saturated throughout the season **5**
- 2a.** Forest communities where trees occupy $\geq 25\%$ total canopy cover, and usually $\geq 60\%$ total canopy cover **3**
- 2b.** Shrub communities where either *Salix interior* or *Cephalanthus occidentalis* dominate, occupying RD $\geq 75\%$ if trees are present, and typically a continuous cover of $\geq 60\%$ total cover **4**
- 3a.** Canopy dominated by *Acer saccharinum* or *Celtis occidentalis*, or a mix of either *Quercus macrocarpa* or *Q. bicolor* with *Ulmus Americana* or *Fraxinus pennsylvanica* as codominants. Total canopy cover can be low ($< 25\%$ or less where reed canary grass dominates the herbaceous layer)..... **Silver Maple - Elm (Cottonwood) Forest**
- Map Class Phases:**
Maple phase: Canopy dominated by *A. saccharinum*
Hackberry phase: Canopy dominated by *C. occidentalis*
Swamp White Oak phase: Canopy codominated by *Q. bicolor*
Bur Oak phase: Canopy with $\geq 50\%$ RD of bur oak
- 3b.** Canopy dominated by *Populus deltoides* and codominated by *Salix nigra*..... **Eastern Cottonwood - Black Willow Forest**
- 4a.** Shrub communities dominated by *Salix interior*. Total tree canopy cover, if any, $< 25\%$ **Sandbar Willow Shrubland**
- 4b.** Shrub community dominated by *Cephalanthus occidentalis*. Total tree canopy cover, if any, $< 25\%$ **Northern Buttonbush Swamp**
- 5a.** Upland forest or woodland communities **6**
- 5b.** Upland shrub communities dominated by *Rhus glabra*, *Cornus racemosa*, typically bordering fields and along forest edges, trees $< 25\%$ RD although aspen or other tree species of shrub height may be present..... **Park Specific Map Class: Upland Scrub Mix**
Formation level of NVCS: Cold-deciduous shrubland
- 6a.** Canopy dominated by *Juniperus virginiana*, *Quercus alba*, *Q. macrocarpa*, or *Q. muehlenbergii*. Total canopy cover ranging from open ($\geq 25\text{--}60\%$) to closed ($\geq 60\%$) **Chinquapin Oak Bluff Woodland**
- Map Class Phases:**
Red-cedar phase: Canopy dominated by *J. virginiana* only
Hillside Prairie phase: Canopy dominated by *Q. muhlenbergii*, *Q. alba*, or rarely by *Q. macrocarpa* and *Betula papyrifera*
- 6b.** Canopy not as above..... **7**
- 7a.** Canopy dominated by *Quercus rubra* and/or *Acer saccharum* **8**
- 7b.** Canopy dominated by *Fraxinus pennsylvanica*, *Ulmus* spp., *Juglans nigra*, or *Celtis occidentalis*. Forests of upland disturbed ravines..... **Ash - Elm - Walnut- Hackberry Semi-natural Forest**

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Effigy Mounds National Monument

8a. Forests with the uppermost canopy usually with *Acer saccharum* present, often with *Tilia americana*, and individually or together reaching $\geq 10\%$ ¹ RD (with varying amounts of *Quercus rubra*, *Q. alba*, and *Carya ovata*, or young stands of small diameter oaks, or with no apparent species dominant)
.....**North-central Maple - Basswood Forest**

Map Class Phases:

East-facing Maple phase: Mature, large-canopied *A. saccharum* shares dominance with *Quercus* spp. On steep east-facing bluffs

North-facing Maple phase: *Acer saccharum* with *Tilia americana* dominating the tree species (<25% *Quercus* spp. or *Carya* spp.), typically on N - NE facing, moist, low-to-mid slopes or in deeply shaded ravines. Signs of recent disturbance (e.g., logging) not apparent

North-facing Red Oak phase: *Q. rubra* $\geq 25\%$ RD, N - NE facing mid-slopes

Disturbed Oak phase: Forests with small crowned trees in the canopy, or larger crowned trees with a patchy, or choppy canopy cover. *Quercus* spp. appear as the most dominant species on the photos, but *Acer saccharum* and/or *Tilia americana* are also present at low RD

Disturbed Maple-Basswood phase: *A. saccharum* and/or *T. americana* the dominant tree species usually with *Ostrya virginiana*, *Q. rubra*, and *Q. alba* on any aspect or ridge top. Stands have a patchy appearance because of recent logging

Disturbed Hardwoods phase: Forests with small crowned trees in the canopy, and no one species obviously dominant

8b. Forests dominated by oak, hickory, or aspen ($\geq 25\%$ oak, or $\geq 50\%$ hickory or aspen), and with <10% RD of *A. saccharum* or *T. americana*
.....

Midwestern White Oak - Red Oak Forest

Map Class phases:

White Oak - Chinquapin Oak phase: Forests dominated by *Q. alba*

Oak - Hickory phase: Forests dominated by oak and hickory with <25% RD *A. saccharum* and/or *T. americana*

Shagbark Hickory phase: Forests dominated by *C. ovata*

Bigtooth Aspen phase: Forests dominated by $\geq 50\%$ RD *Populus grandidentata*

Trembling Aspen phase: Forests dominated by $\geq 50\%$ *Populus tremuloides*. Typically, small stands on edges of larger tracts of oak and hickory

HERBACEOUS VEGETATION KEY¹

1a. Herbaceous vegetation of bottomlands and floodplains, including permanently flooded habitats	2
1b. Herbaceous vegetation of uplands (soils that are not flooded or saturated throughout the growing season)	3
2a. Wetlands associated with farm ponds.....	4
2b. Wetlands not associated with farm ponds	5
3a. Natural vegetation of hillside prairie remnants, or planted, managed prairies.....	6
3b. Fallow fields with mix of native and non-native (naturalized) or weedy herbaceous vegetation	
..... Park Special Map Class: Upland Herbaceous Mix	
..... Formation level of the NVCS: Tall sod temperate grassland	
4a. Farm ponds dominated by submersed aquatic vegetation.....	
..... Park Special Map Class: Submersed Aquatic Farm Pond	
..... Formation level of the NVCS: Permanently flooded temperate or subpolar hydromorphic-rooted vegetation	
4b. Farm ponds dominated by emergent vegetation (e.g., <i>Schoenoplectus</i> spp., <i>Typha</i> spp., <i>Sagittaria</i> spp.)	
..... Park Special Map Class: Emergent Marsh Farm Pond:	
..... Formation level of the NVCS: Seasonally flooded temperate or subpolar grassland	
5a. Submersed or floating-leaved aquatic vegetation of permanently flooded ponds and rivers.....	7
5b. Wet meadow or emergent vegetation, in saturated or seasonally flooded wetlands and marshes	10
6a. Small hillside prairie remnants on south-facing steep bluffs, characterized by a diversity of prairie forbs and grasses	
..... Park Special Map Class: Goat Prairie Remnant	
..... Formation level of the NVCS: Medium-tall sod temperate or subpolar grassland	
6b. Planted prairies on wide ridge tops within the North and South Units.....	Central Mesic Tallgrass Prairie
7a. Aquatic vegetation dominated by floating-leaved species.....	8
7b. Aquatic vegetation dominated by submersed species (e.g., <i>Potamogeton</i> spp., <i>Ceratophyllum</i> spp.)	
..... Midwest Pondweed Submerged Wetland	
8a. <i>Nymphaea odorata</i> the dominate floating-leaved species	Water Lily Aquatic Wetland
8b. <i>Nelumbo lutea</i> the dominate floating-leaved species	American Lotus Aquatic Wetland
9a. Wetlands dominated by <i>Schoenoplectus fluviatilis</i> , <i>Phalaris arundinacea</i> , <i>Sparganium eurycarpum</i> , <i>Sagittaria</i> spp., or <i>Leersia oryzoides</i>	10
9b. Wetlands dominated by a mix of wetland forbs such as <i>Solidago</i> spp. <i>Heracleum lantanum</i> , and <i>Aster simplex</i>	
..... Park Special Map Class: Bottomland Herbaceous Mix	
..... Formation level of the NVCS: Temporarily flooded temperate of subpolar grassland	
10a. Wetlands dominated by <i>Schoenoplectus fluviatilis</i> or <i>Phalaris arundinacea</i>	11
10b. Wetlands dominated by <i>Sparganium eurycarpum</i> , <i>Sagittaria</i> spp., or <i>Leersia oryzoides</i>	12

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Effigy Mounds National Monument

11a. Wetlands dominated by *Schoenoplectus fluviatilis*..... **River Bulrush Marsh**

11b. Wetlands dominated by *Phalaris arundinacea* **Reed Canary Grass Eastern Marsh**

12a. Wetlands dominated by *Sparganium eurycarpum*..... **Bulrush - Cattail - Burreed Shallow Marsh**

12b.Wetlands dominated by *Sagittaria* spp. or *Leersia oryzoides* **Arrowhead - Rice Cutgrass Marsh**

Map Class phases:

Rice cutgrass phase: Communities dominated by *L. oryzoides*

Arrowhead phase: Communities dominated by *Sagittari* spp.